GD Midea Refrigeration Equipment Co.,Ltd

MULTI SPLIT TYPE, HEAT PUMP AIR CONDITIONERS

Technical service manual 2006

R410A Corona Inverter multi Series

Indoor Models

MSCI-07HRIN1

MSCI-09HRIN1

MSCI-12HRIN1

Outdoor Models

M2OA-18HRIN1

M3OA-27HRIN1

M40A-27HRIN1

1. Product features
2. Specification
3. Dimensions
4. Refrigeration cycle diagram
5. Operation temperature limits
6. Indoor units combination
7. Wiring diagram
8. Wiring connection
9. Electric control functions
10. Troubleshooting

Annex 1 Characteristic of temp. sensor

Annex 2 Reference data

1 Product Features

1.1 Powerful at cooling/heating.

1.2 Low voltage start-up function.

1.3 Anti-icing function at cooling mode.

1.4 Anti-cold air function at heating mode.

1.5 Auto-defrosting.

1.6 Outdoor electric current protection

1.7 Temperature protection of the outdoor compressor top.

1.8 Error self diagnosis function.

1.9 Free connection between indoor and outdoor unit

2 Specification

2.1 Corona series

Model			MSCI-07HRIN1	MSCI-09HRIN1	MSCI-12HRIN1
Power supply		Ph-V-Hz	1Ph,220-240V~,50Hz	1Ph,220-240V~,50Hz	1Ph,220-240V~,50Hz
Capacity	Cooling Capacity	BTU/h	7000	9000	12000
	Heating Capacity	BTU/h	8500	11000	13000
	Running Current	A	0.18	0.18	0.20
	Design Pressure (Hi/Lo)	Mpa	4.2/2.5	4.2/2.5	4.2/2.5
	Max. Operating Pressure (Hi/Lo)	Mpa	3.5/3.5	3.5/3.5	3.5/3.5
Indoor fan motor	Model		RPG18H	RPG18H	RPG13D
	Brand		Welling	Welling	Welling
	Input	W	37	37	38.5
	Capacitor	uF	1.2	1.2	1.2
	Speed(hi/mi/lo)	r/min	1200/1000/850	1200/1000/850	1180/1000/850
Indoor coil	a.Number of rows		2	2	2
	b.Tube pitch(a)x row pitch(b)	mm	21x13.37	21x13.37	21x13.37
	c.Fin spacing	mm	1.5	1.3	1.3
	d.Fin type (code)		hydrophilic aluminium	hydrophilic aluminium	hydrophilic aluminium
	e.Tube outside dia.and type	mm	φ7 INNEGROOVE TUBE	φ7 INNEGROOVE TUBE	φ7 INNEGROOVE TUBE
	f.Coil length x height x width	mm	538X252X26.74	538X252X26.74	578X252X26.74
	g.Number of circuits		2	2	2
Indoor air flow (Hi/Mi/Lo)		m3/h	570/480/350	570/480/350	600/520/420
Indoor noise level (Hi/Mi/Lo)		dB(A)	35/32/30	37/34/31	40/37/34
Indoor unit	Liquid side/ Gas side	mm(inch)	Φ6.35/Φ9.53	Φ6.35/Φ9.53	Φ6.35/Φ12.7
	Dimension (W*H*D)	mm	710×250×195	710×250×195	790×265×195
	Packing (W*H*D)	mm	800×340×270	800×340×270	875x285x375
	Net/Gross weight	Kg	8/9.5	8/9.5	9/11

2.2 Outdoor unit

Outdoor Unit Model			**M2OA-18HRIN1**		**M3OA-27HRIN1**		
Indoor Units Combination			**Single**	**Double**	**Single**	**Double**	**Treble**
Power supply		Ph-V-Hz	1Ph,220-240V~,50Hz		1Ph,220-240V~,50Hz		
Cooling	Capacity	Btu/h	7000～12000	18000	7000～12000	16000～24000	27000
	Capacity	W	2050~3517	5275	2000～3500	4690～7000	7913
	Input	W	1000~1300	1813	1000～1300	2570～2850	2806
	Rated current	A	4.8~6.5	11.5	4.8~6.5	11.7~13.5	13.5
	EER	Btu/w.h	/	9.93	/	/	9.62
	EER	w/w	/	2.91	/	/	2.82
Heating	Capacity	Btu/h	9000～14000	21000	10000～14000	24000～27000	30000
	Capacity	W	2638～4103	6155	2900～4100	7000～7900	8792
	Input	W	1300～1600	2038	1300～1600	2100～2750	2739
	Rated current	A	6.3~7.8	11.0	6.3~7.8	11.0~13.2	13.2
	COP	Btu/w.h	/	10.30	/	/	10.95
	COP	w/w	/	3.02	/	/	3.21
Max. input consumption		W	3200		3200		
Max. current		A	20		20		
Compressor	Model		BA160X2CS-20KU		BA160X2CS-20KU		
	Type		Rotary inverter		Rotary inverter		
	Brand		GD Toshiba		GD Toshiba		
	Capacity	Btu/h	18000(60HZ)		18000(60HZ)		
	Input	W	1690（60HZ）		1690（60HZ）		
	Rated current(RLA)	A	11.6（60HZ）		11.6（60HZ）		
	Locked rotor Amp(LRA)	A	60		60		
	Thermal protector		Internal		Internal		
	Capacitor	uF	85UF/250V		85UF/250V		

	Refrigerant oil	ml	RB68AF/α68TF/T-68 750 ml			RB68AF/α68TF/T-68 750 ml		
Outdoor fan motor	Model		YDK53-6M			YDK53-6M		
	Brand		Welling			Welling		
	Input	W	148			148		
	Capacitor	uF	3.0			3.0		
	Speed	r/min	775			775		
Outdoor coil	a.Number of rows		1.5			1.5		
	b.Tube pitch(a)x row pitch(b)	mm	25.4×22			25.4×22		
	c.Fin spacing	mm	1.7			1.7		
	d.Fin type (code)		Hydrophilic aluminium			Hydrophilic aluminium		
	e.Tube outside dia.and type	mm	φ9.53 innergroove trube			φ9.53 innergroove trube		
	f.Coil length x height x width	mm	776×660×22			776×660×22		
	g.Number of circuits		2			2		
Outdoor air flow		m3/h	2500			2500		
Outdoor noise level		dB(A)	60			60		
Outdoor unit	Dimension(W*H*D)	mm	845X695X335			845X695X335		
	Packing (W*H*D)	mm	975X772X405			975X772X405		
	Net/Gross weight	Kg	68/72			72/76		
Refrigerant type		R410A g	2200			2350		
Design pressure(Hi/Lo)		MPa	4.2/2.5			4.2/2.5		
Refrigerant piping	Liquid side/ Gas side	mm(inch)	Φ6.35/Φ9.53	Φ6.35/Φ9.53		Φ6.35/Φ9.53	Φ6.35/Φ9.53	Φ6.35/Φ9.53
	Transfer Connector(9.53→12.7)	mm(inch)	2			2		
	Max. refrigerant pipe length	m	15	15		15	15	15
	Max. difference in level	m	10	10		10	10	10
Connection wiring			No					
Plug type			No					
Thermostat type			Electronic control					

Operation temp	℃	17-30
Ambient temp	℃	17~43(cooling); -7~21(heating)

Outdoor Unit Model			**M4OA-27HRIN1**			
Indoor unit combination			single	double	Treble	Quadplex
Power supply		Ph-V-Hz	1Ph,220-240V~,50Hz			
Cooling	Cooling Capacity range	Btu/h	7000~18000	14000~24000	21000~26000	27000
	Capacity		2052~5275	4100~7034	6155~7620	7913
	Rated input power range	W	960~2510	1450~2830	2050~3100	2777
	Rated current range	A	4.4~12.0	6.6~13.0	9.4~14.6	14.8
	EER	Btu/w.h	/	/	/	9.72
	EER	w/w	/	/	/	2.85
Heating	Heating Capacity range	Btu/h	9000~18000	16000~25000	21000~27000	28000
	Capacity		2638~5275	4689~7327	6155~7913	8206
	Rated input power range	W	1100~2430	1400~2520	2020~3000	2548
	Rated current range	A	5.0~11.6	6.4~12.0	9.3~13.8	13.9
	COP	Btu/w.h	/	/	/	10.99
	COP	w/w	/	/	/	3.22
Max. input consumption		W	4500			
Max. current		A	25			
Compressor	Model		BA160X2CS-20KU			
	Type		Rotary inverter			
	Brand		GD Toshiba			
	Capacity	Btu/h	18000(60HZ)			
	Input	W	1690（60HZ）			
	Rated current(RLA)	A	11.6（60HZ）			

	Locked rotor Amp(LRA)	A	60
	Thermal protector		Internal
	Capacitor	uF	85UF/250V
	Refrigerant oil	ml	RB68AF/α68TF/T-68 750 ml
Outdoor fan motor	Model		YDK100-6
	Brand		Welling
	Input	W	169(HIGH)
	Capacitor	uF	5uF/500VAC
	Speed	r/min	900(HIGH)
Outdoor coil	a.Number of rows		2
	b.Tube pitch(a)x row pitch(b)	mm	25.4×22
	c.Fin spacing	mm	1.5
	d.Fin type (code)		Hydrophilic aluminium
	e.Tube outside dia.and type	mm	φ9.53 innergroove tube
	f.Coil length x height x width	mm	850×810×44
	g.Number of circuits		2
Outdoor air flow		m3/h	3500
Outdoor noise level		dB(A)	57
Outdoor unit	Dimension(W*H*D)	mm	895X860X330
	Packing (W*H*D)	mm	1043X915X395
	Net/Gross weight	Kg	80/84
Refrigerant type and charge		g	R410A, 2700
Design pressure(Hi/Lo)		MPa	4.2/2.5
Refrigerant piping	Liquid side/ Gas side	mm(inch)	6.35(1/4")/9.53(3/8")
	Transfer Connector(9.53→12.7)	mm(inch)	3
	Max. refrigerant pipe length for each unit	m	15

	Max. difference in level between indoor and outdoor unit	m	10
Connection wiring			No
Plug type			No
Thermostat type			Electronic control
Operation temp	Cooling	℃	17~43
	heating	℃	-7~21

Notes:

1. Nominal cooling capacities are based on the following conditions:

Indoor temp: 27°CDB, 19°CWB;

Outdoor temp: 35°CDB;

Equivalent ref. Piping: 8m(horizontal)

2. Nominal heating capacities are based on the following conditions:

Indoor temp: 20°CDB;

Outdoor temp: 7°CDB, 6°CWB;

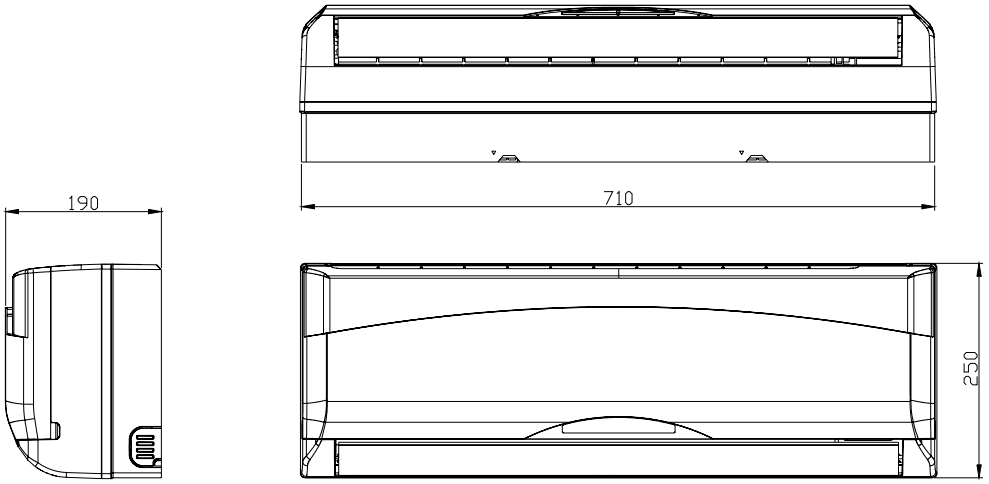
Equivalent ref. Piping: 8m(horizontal)

3. Actual noise level may differ, depending on the room structure, etc, since these noise values are from an anechoic room.

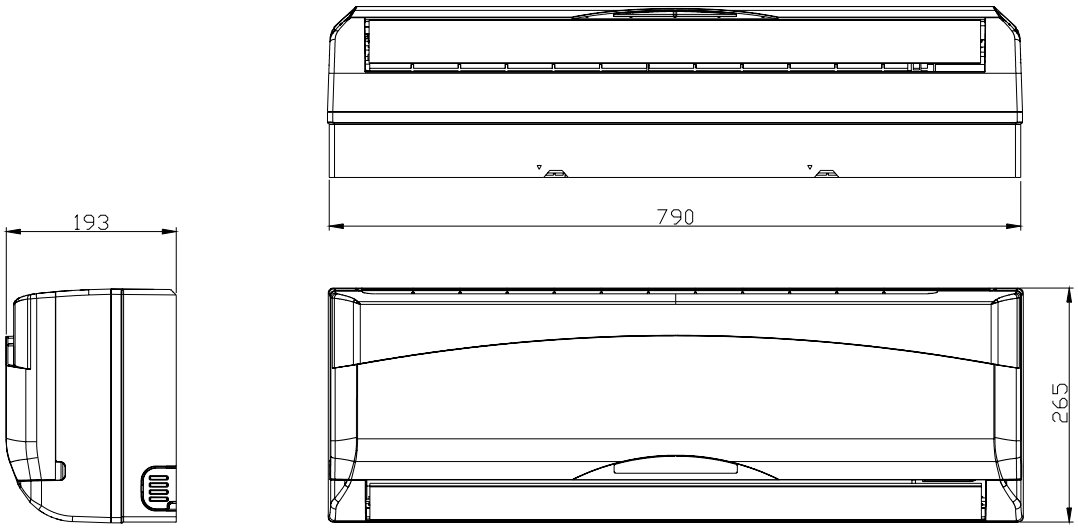
3 Dimensions

3.1 Corona Series

a) Indoor unit 7/9K

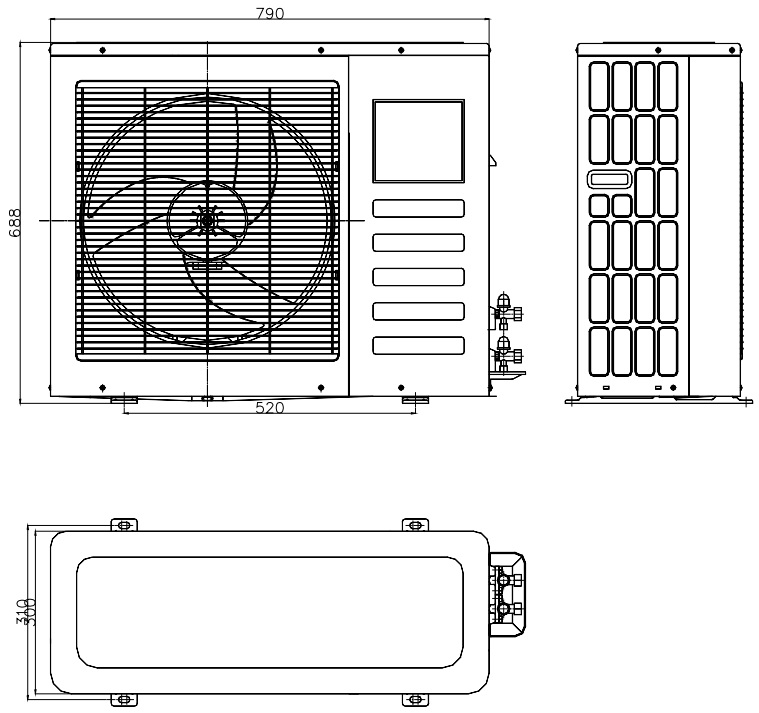


b) Indoor Unit 12K

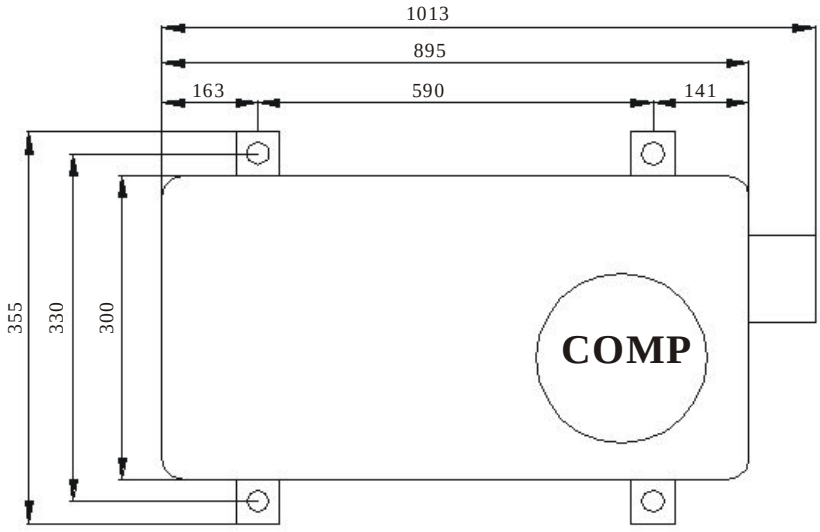


3.2 Outdoor unit

a) Outdoor unit M2OA-18HRIN1& M3OA-27HRIN1

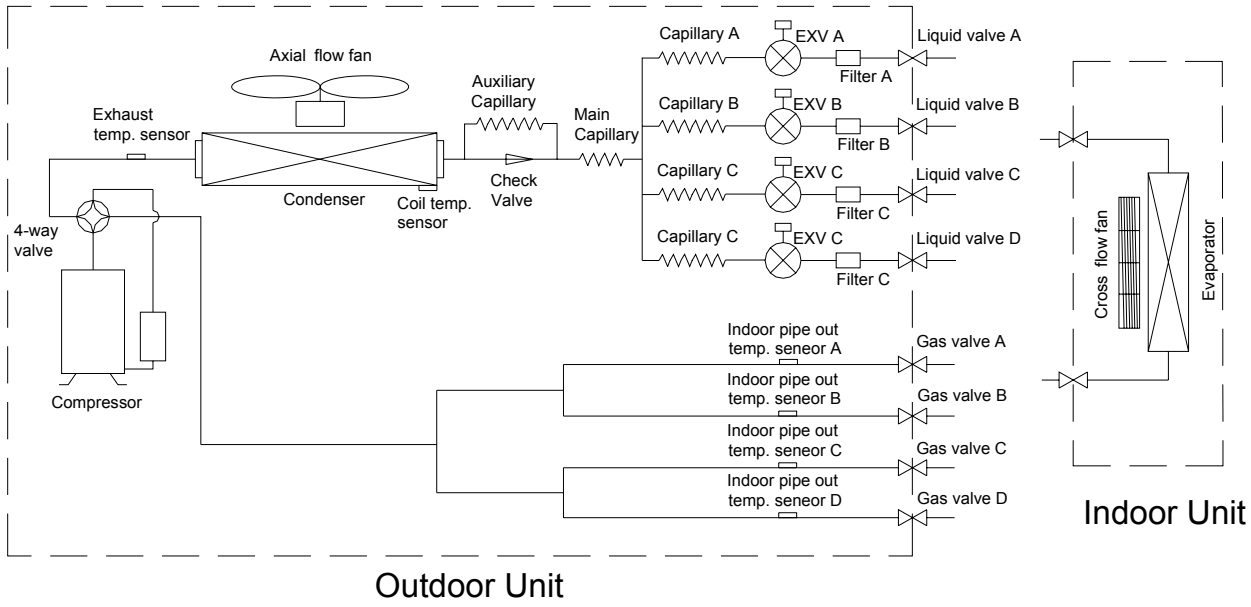


b) Outdoor unit M4OA-27HRIN1

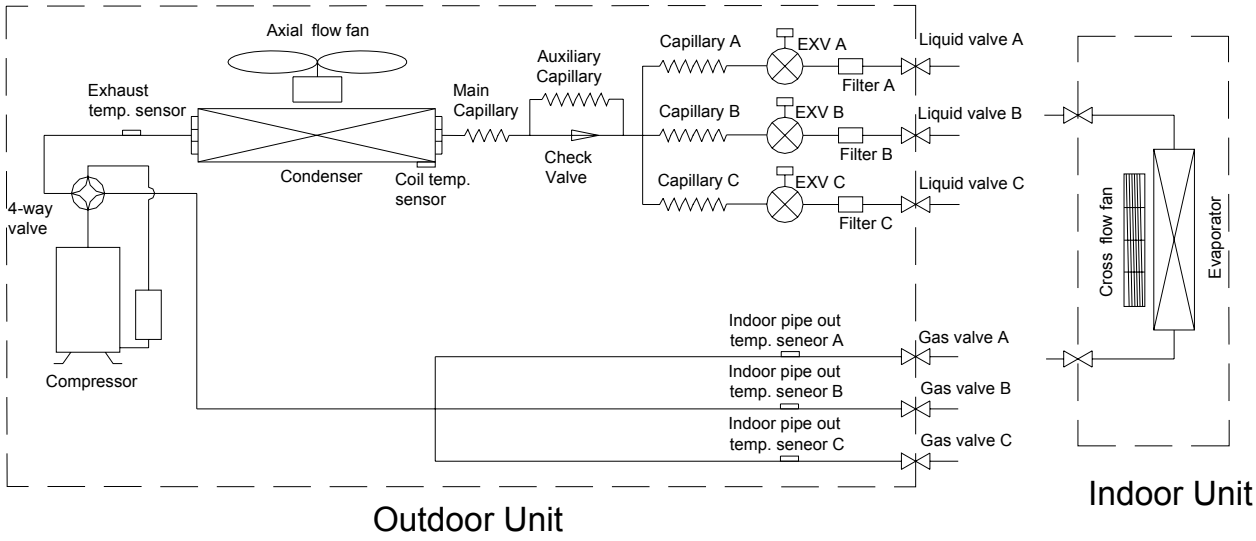


4 Refrigeration Cycle Diagram

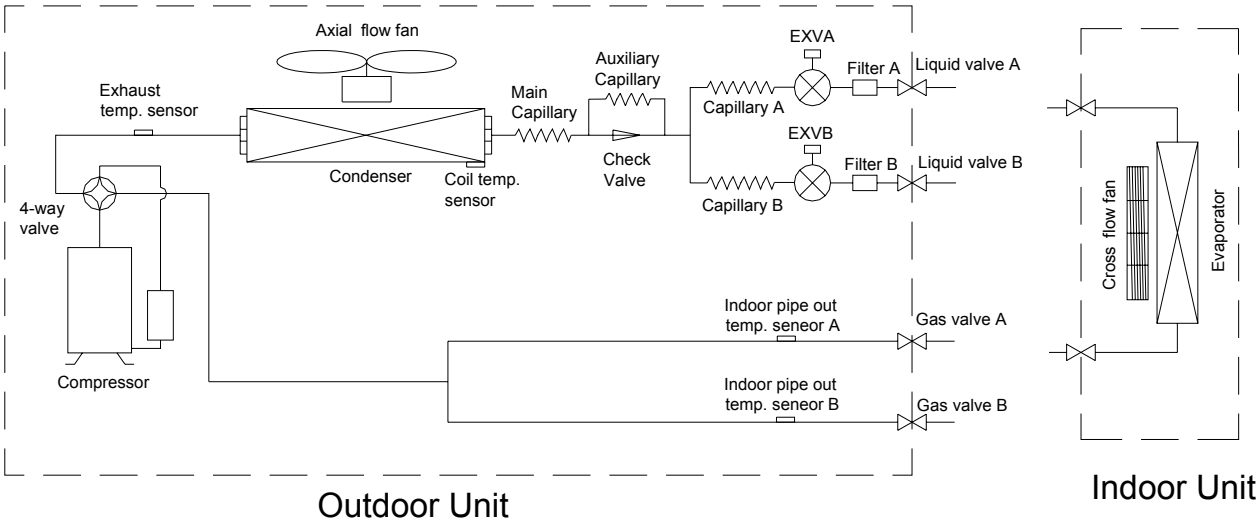
4.1 Refrigeration circuit drawing of inverter quadplex type



4.2 Refrigeration circuit drawing of inverter triple type



4.2 Refrigeration circuit drawing of inverter binary type



5 Operation Temperature Limits

Cooling mode	Indoor temperature	17°C～32°C
	Outdoor temperature	0°C～50°C
Heating mode	Indoor temperature	<=30
	Outdoor temperature	-15°C～33°C
Dry mode	Indoor temperature	10°C～32°C
	Outdoor temperature	0°C～50°C

6 Indoor units combination

6.1 Indoor unit combination for M2OA-18HRIN1

One unit	Two unit		
7	7+7	9+9	12+12
9	7+9	9+12	12+18
12	7+12	9+18	
18	7+18		

Instruction:

1).The total indoor units nominal capacity should not exceed 8.5kw for M2OA-18HRIN1;

2). When two indoor units are connected,

a. there should be no more than one cassette.

b. if one cassette is present, the other indoor unit should not be 18k unit.

6.2Indoor unit combination for M3OA-27HRIN1

One unit	Two unit			Three unit		
7	7+7	9+9	12+12	7+7+7	7+9+9	9+9+12
9	7+9	9+12	12+18	7+7+9	7+9+12	9+12+12
12	7+12	9+18		7+7+12	7+12+12	
18	7+18			7+7+18	9+9+9	

Instruction:

1).The total indoor units nominal capacity should not exceed 9.3kw for M3OA-27HRIN1;

2).When three indoor units are connected,

a. there should be no more than one 18k (either cassette or duct) indoor unit;

b. there should be no more than one cassette.

c. if one cassette or one 18k unit is present, the other indoor units should be all 7K.

3). When two indoor units are connected,

a. there should be no more than one 18k(either cassette or duct).

b. there should be no more than one cassette.

c. if one cassette is present, the other indoor unit should not be 18k unit.

6.4 Indoor unit combination for M4OA-27HRIN1

One unit	Two unit			Three unit				Four unit		
7	7+7	9+9	12+12	7+7+7	7+9+9	7+12+18	9+12+12	7+7+7+7	7+7+9+9	9+9+9+9
9	7+9	9+12	12+18	7+7+9	7+9+12	9+9+9	9+12+18	7+7+7+9	7+7+9+12	9+9+9+12
12	7+12	9+18		7+7+12	7+9+18	9+9+12	12+12+12	7+7+7+12	7+9+9+9	
18	7+18			7+7+18	7+12+12	9+9+18		7+7+7+18	7+9+9+12	

Instruction:

1).The total indoor units nominal capacity should not exceed 11.3kw for M4OA-27HRIN1;

2).When four indoor units are connected,

a. there should be no more than one 18k (either cassette or duct) indoor unit;

b. there should be no more than one cassette;

c. if one cassette or one 18k unit is present, the other indoor units should be all 7K.

3). When three indoor units are connected,

a. there should be no more than one 18k(either cassette or duct).
b. there should be no more than one cassette;
c. if one cassette is present, the other duct units should be all 7K.

4). When two indoor units are connected,
a. there should be no more than one 18k(either cassette or duct).
b. there should be no more than one cassette.
c. if one cassette is present, the other indoor unit should not be 18k unit.

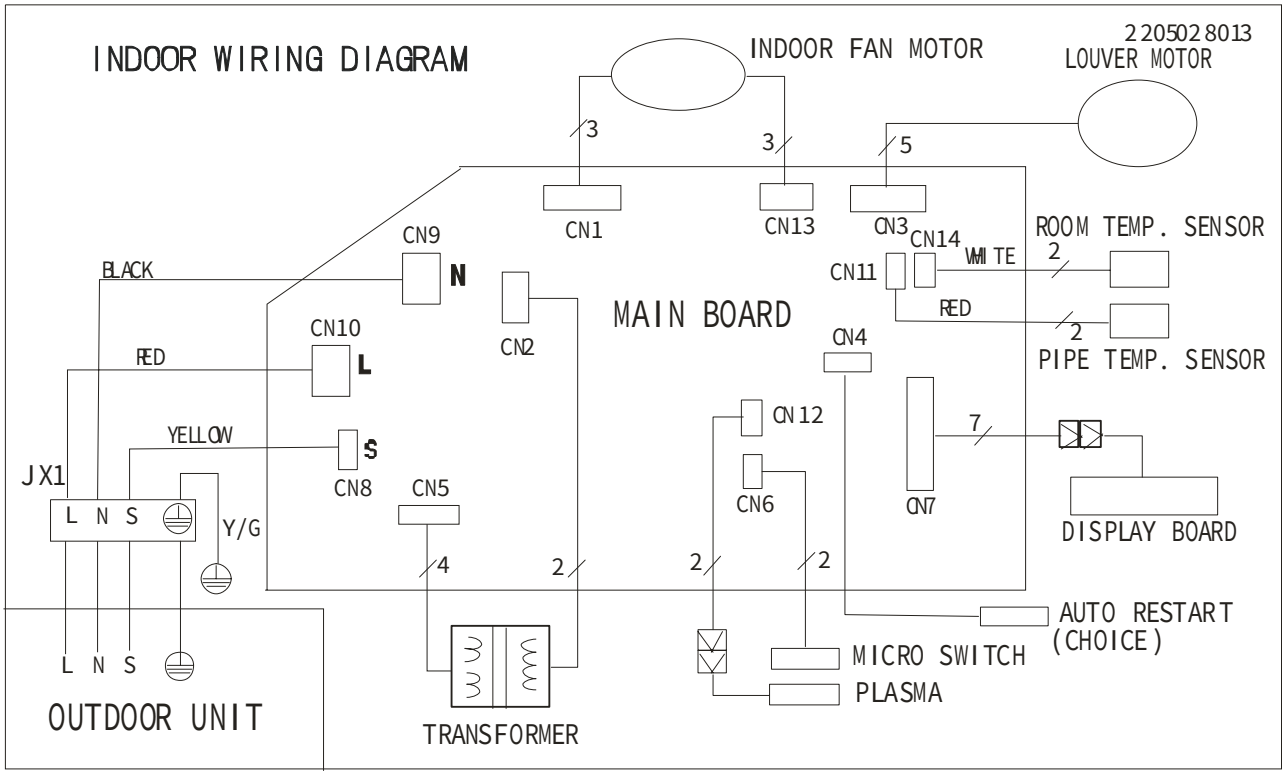
Remark:

1). As 18000 Btu/h indoor units, just Cassette and duct are available.
2). When heating, capacity attenuate sharply if indoor unit capacity exceed too much.
3). Indoor unit nominal capacity

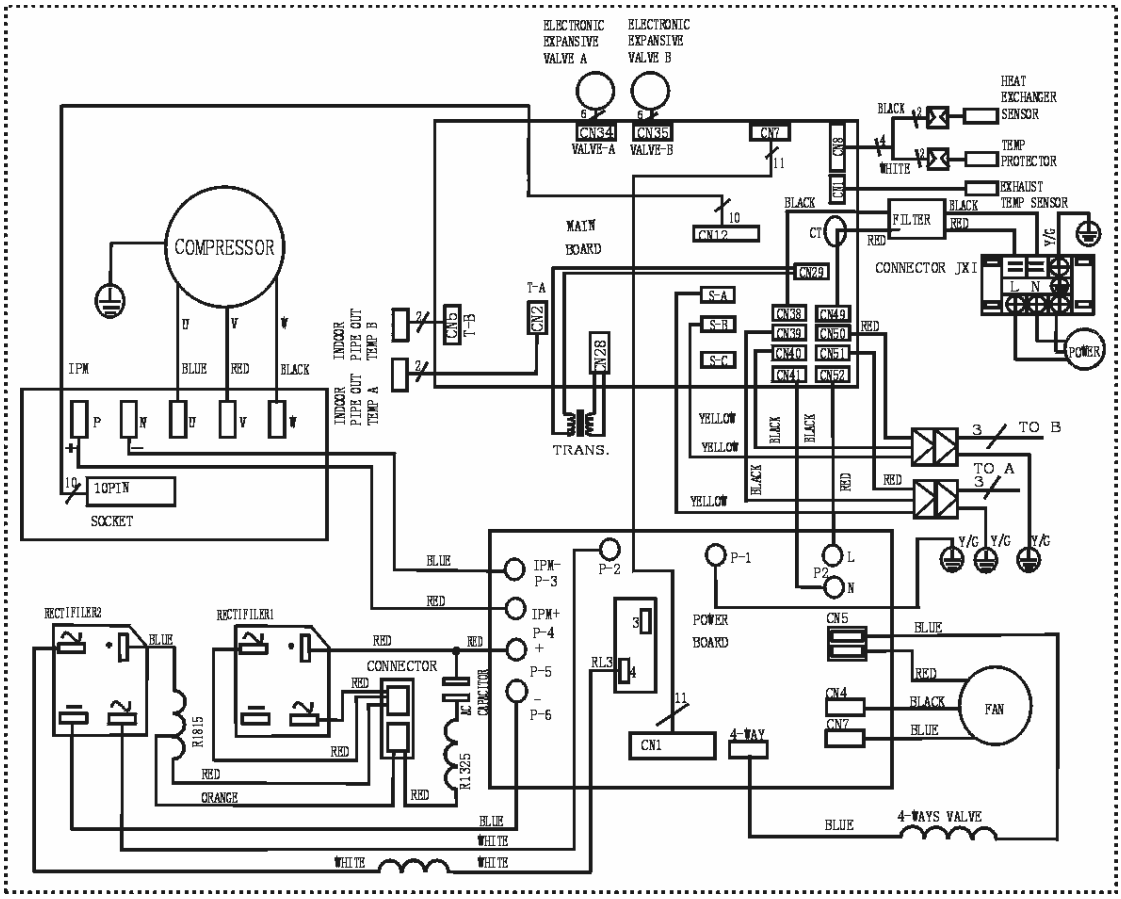
Unit	Nominal capacity(kW)
7k	2.0
9k	2.6
12k	3.2
18k	5.3

7. Wiring Diagram

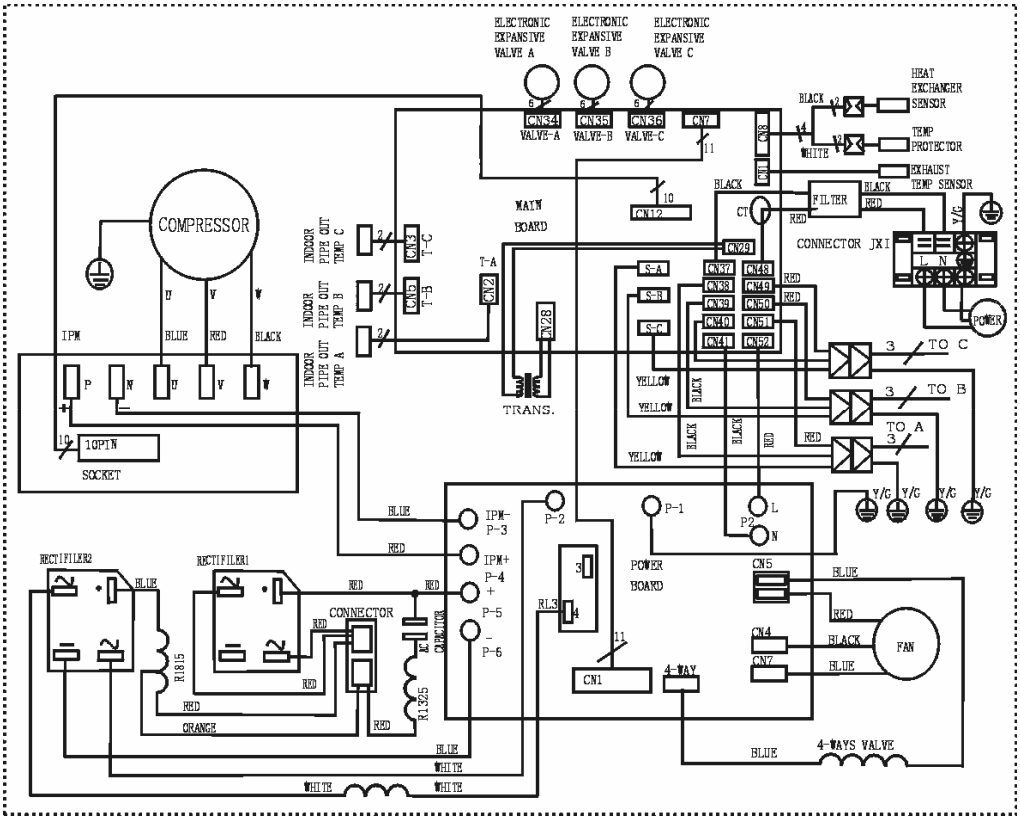
7.1 Indoor unit



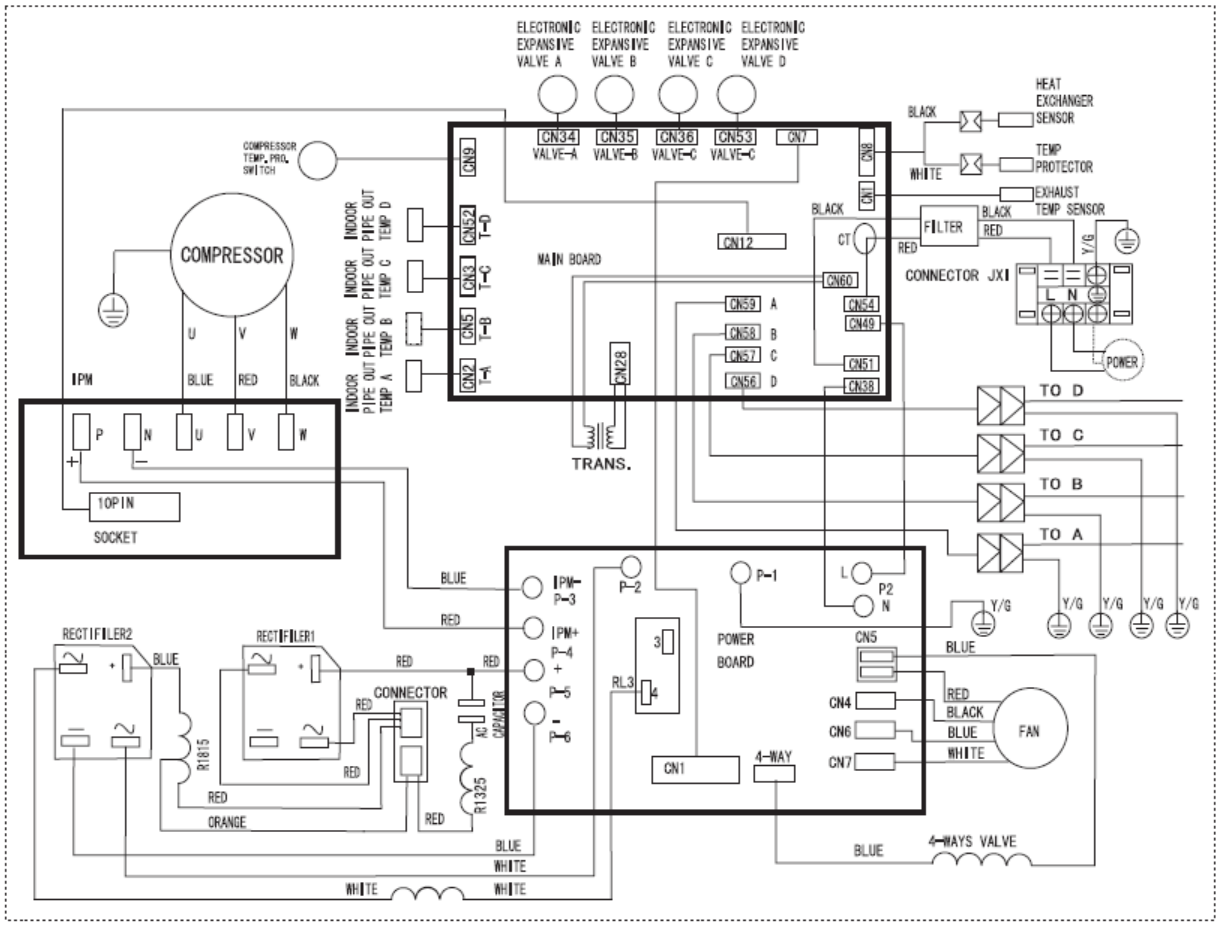
7.2 Outdoor unit M2OA-18HRIN1



7.3 Outdoor unit M3OA-27HRIN1



7.4 Outdoor unit M4OA-27HRIN1



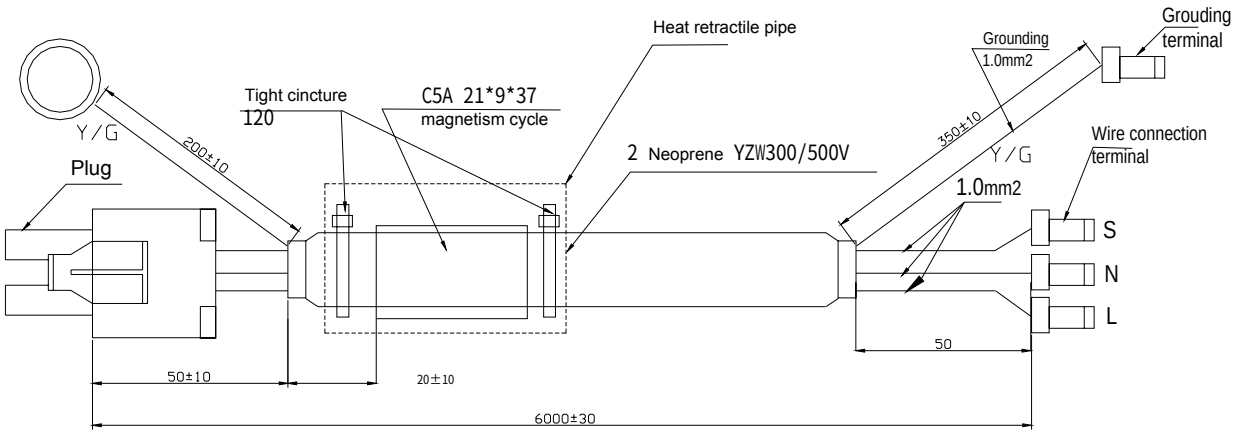
8 Wire connection

8.1 Connection wire specification

	Standard length(mm)	Cores	Thickness(mm^2)	Wire cover specification
Connection wire between indoor unit and outdoor unit	6000	4 (L,N,S,Grounding)	1.0	Neoprene YZW300/500V

Remark: The connection wire between indoor unit and outdoor unit is standard. And it is packaged in the indoor unit.

8.2 Connection wire drawing



9 Electronic control function

9.1 Protection

1. 3 minutes delay at restart for compressor.
2. Temperature protection of compressor top, compressor stops when the temp. of top of compressor is more than 120°C, compressor runs when the temp. of top of compressor is less than 105°C.
3. When AC voltage ≥ 270V for 30 seconds, Outdoor Unit stops operation and alarms. When AC voltage ≤ 260V for 30 seconds, Outdoor Unit resumes operation.
4. Inverter module protection, Inverter module Protection itself has a protection function against current, voltage and temperature.
5. Sensor protection at open circuit and breaking disconnection.
6. Fan Speed is out of control. When Indoor Fan Speed is too high(higher than High Fan+300RPM)or too low(lower than 400RPM), the unit stops and LED displays failure information and can't return to normal operation automatically.
7. Cross Zero signal error warning. If there is no Cross Zero signals in 4 minutes, the unit stops and LED displays failure information and can't return to normal operation automatically.

8. Current protection: When the current is more than 25A, the compressor stops.
9. Outdoor condenser high temperature protection: Under cooling mode, if T3>65℃ for 3 minutes, the compressor will stop. When T3<52℃, the protection is not valid.
10. Outdoor low temperature protection: If the outdoor temperature is lower than -15℃ for 1hour, the compressor and fan motor will stop. If the outdoor temperature is higher than -12℃ for 10 minutes and the compressor stops operation for 1h, or the outdoor temperature is higher than 5℃ for 10 minutes, then restart and enter into the prior operation mode.
11. Compressor pre-heating function: When the outdoor temperature is lower than 3℃ and the compressor stops operation for more than 3 hours, or the outdoor temperature is lower than 3℃ and the power is just put on, the compressor enters into pre-heating condition. When outdoor temp. is more than 5℃ or user operate it, pre-heating condition will finish.

9.2 Operating mode

9.2.1 Cooling mode

1.Indoor fan keeps running, fan speed can be set in high/mid/low/ Auto:

2.Auto fan at cooling mode: (T=Indoor Temp.-Setting Temp.)

	Condition	Indoor fan speed
Room temp. up	T<1.5℃	Low
	1.5℃<T<4℃	Mid.
	T>4℃	High
Room temp. down	T> 3℃	High
	1℃<T<3℃	Mid.
	T<1℃	Low

3.Anti-freezing control to indoor evaporator at cooling mode(T: evaporator temp.)

	Evaporator Temp.	Compressor
	T< 4℃	Off
	T > 8℃	On

9.2.2 Dehumidifying mode

1.The indoor fan is fixed in low speed

2. Low room temperature protection:
When room temperature decreases to below 10℃, indoor fan stop, when room temperature restores to over 12℃, indoor fan start.

3. At dehumidifying mode, the anti-freezing function of the indoor heat exchanger is the same as that of cooling mode.

9.2.3 Heating mode

1. Indoor Fan actions at heating mode

Indoor Fan can be set at HIGH/MID/LOW/AUTO by using a remote controller, but

Anti-cold wind function prevails.

Anti-cold wind control function at heating mode

	Condition T= Indoor exchanger temp.	Indoor fan speed
Indoor exchanger temp. up	T<34℃	Off
	34℃<T<37℃	Breeze
	37℃<T<44℃	Low speed
	T> 44℃	Setting fan speed
Indoor exchanger temp. down	T> 38℃	Setting fan speed
	33℃<T<38℃	Low speed
	24℃<T<33℃	Breeze
	T<24℃	Off

1. Auto wind at heating mode

	Condition T=Indoor Temp.-Setting Temp.	Indoor fan speed
Room temp. up	T<1.5℃	High
	1.5℃<T<2.5℃	Mid.
	T>2.5℃	Low
Room temp. down	T<1.0℃	High
	1.0℃<T<2.0℃	Mid.
	T>2.0℃	Low

2. Indoor evaporator high-temperature protection at heating mode

Condition T= Indoor exchanger temp.	Compressor
T<48℃	On
53℃<T<63℃	Decrease frequency of compressor
T>63℃	Off

9.2.4 Defrost operation

1. Defrosting condition:

The temperature of outdoor heat exchanger remains consecutively lower than -2°c for more than 40 minutes,

2. Ending condition of defrosting

If one of following conditions is satisfied, end the defrost and turn into heating mode:

a. The defrost time has reached to 10 minutes.

b. When the temperature of outdoor heat exchanger rises up to 15°C.

3. Defrosting Actions:

a. Compressor runs.

b. 4 way valve switches off,

c. Outdoor fan switches off

d. Indoor fan running according to anti-cold wind function in heating mode.

4. Automatic operation mode

The air conditioner automatically selects one of the following operation modes: cooling, heating or fan only according to the temp. difference between room temp. (TA) and set temp. (TS).

TA—TS	Operation mode
TA—TS>2℃	Cooling
-1℃≤TA-TS≤+2℃	Fan-only
TA-TS<-1℃	Heating (air-only for cooling only type)

9.3 Mode conflict

The indoor units can not work cooling mode and heating at same time.
Heating mode has a priority.

9.3.1Definition

	Cooling mode	Heating Mode	Fan	Off
Cooling mode	No	Yes	No	No
Heating Mode	Yes	No	Yes	No
Fan	No	Yes	No	No
Off	No	No	No	No

No: No mode conflict;
Yes: Mode conflict

9.3.2 Unit action

- In case of one Indoor unit working in cooling mode or fan mode, and another indoor unit is set to heating mode, the indoor unit working in cooling mode or fan mode will change to stand by. The outdoor unit will work in heating mode.
- In case of one Indoor unit working in heating mode, and another indoor unit is set to cooling mode or fan mode, the indoor unit setting to cooling mode or fan mode will change to stand by.

9.4 Manual switch

Mode changes when push this button.
Cooing mode→ Auto mode→Unit off→ Cooing mode
At Cooing mode, after 30 minutes cooling operation whose fan speed is set as low, the A/C operates with a setting temp. of 24℃.
At auto mode, the A/C operates with a set temp. of 24℃

9.5 Timer Function

1. The maximum length of timer is 24 hours and the minimum resolving power is 15 minutes.
2. Timer on: first turn off the A/C, the A/C will be automatically on at the set time.
3. Timer off: first turn on the A/C, the A/C will be automatically off at the set time
4. Timer on/off function(on time is earlier than off time): first turn off the A/C, it will be automatically on at set time, and later be off at the set time, then unit turns on at set time.
5. Timer off/on function(off time is earlier than on time): first turn on the A/C, it will be automatically off at set time, and later be on at the set time, then unit turns off at set time.

9.6 Sleep mode

9.6.1It is available at cooling, heating or auto mode.
9.6.2Cooling:

The set temperature rise 1°C per hour. Two hours later, the set temperature will maintain as a constant and the fan speed is kept at low speed.

9.6.3Heating:

The set temperature decrease 1°C per hour. Two hours later, the set temperature will maintain as a constant and the air circulation is kept at low speed (Cold air proof function takes precedence over all).

9.6.4 Auto:

The Sleep Mode running function operates in accordance with selected running mode by auto mode.

9.6.5After 7 hours, unit cancels this mode automatically.

J2	On	On	Off	Off
J3	On	Off	On	Off
Stop time	7 hours	8 hours	6 hours	7 hours

9.7 Auto restart function

In case of a sudden power failure, this function automatically sets the unit to previous settings before the power failure when power returns.

9.8 Capacity test frequency locked.

When test the cooling capacity, the frequency can be locked at Rated Frequency by following the below:

1. Set the indoor temp. to 17°C and high speed;
2. Push the outdoor check button for 5 seconds, then its frequency can be fixed at Rated Frequency.

After the test is over, turn off the indoor to exit.

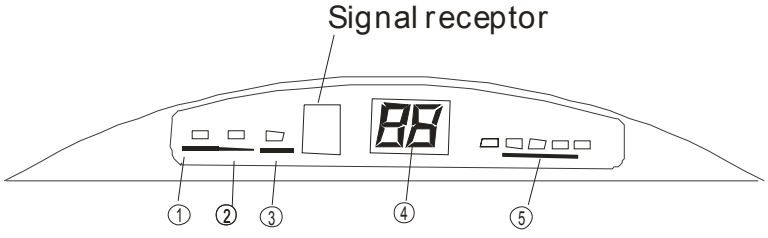
When test the heating capacity, the frequency can be locked at 85Hz by following the below:

1. Set the indoor temp. to 30°C and high speed;
2. Push the outdoor check button for 5 seconds, then its frequency can be fixed at Rated Frequency.

After the test is over, turn off the indoor to exit.

9.9 Indoor unit indicator displayer

9.9.1 Display panel



9.9.2 Display function

AUTO indicator

This indicator illuminates when the air conditioner is in AUTO operation.

TIMER indicator

This indicator illuminates when TIMER is set ON/OFF.

PRE.-DEF. Indicator (For Cooling & Heating models only)

This indicator illuminates when the air conditioner starts defrosting automatically or when the warm air control feature is activated in heating mode.

TEMPERATURE indicator

Usually it displays the temperature settings. When change the setting temperature, this indicator begins to flash, and stops 20 seconds later.

It displays the room temperature when the air conditioner is in FAN only operation.

When the unit stops operation, it returns to original factory settings.

Displays the malfunction code or protection code.

OPERATION indicator

This indicator flashes after power is on and illuminates when the unit is in operation.

FREQUENCY indicator

This indicator appears only when the compressor is in operation and indicates the current operating frequency.

9.10 Outdoor unit LED display function:

1. When stand-by it display number of indoor unit online;
2. When operation it display frequency of outdoor unit;
3. When defrost it display “df”;
4. When a protection or error occurred, it displays error code or protection code.

9.11 Check function:

There is a check button on outdoor pcb. When push this button, the outdoor LED can display in sequence:

Capacity demand→Running mode →revised capacity → fan state →No.1 evaporator pipe temp. →No.2 evaporator pipe temp.→No.3 evaporator pipe temp.→No.4 evaporator pipe temp.→outdoor pipe temp. → Outdoor temp. →discharge gas temp.→current of outdoor unit → No. 1 opening degree of electronic expansion valve → No. 2 opening degree of EXV → No. 3 opening degree of EXV→No. 4 opening degree of EXV→indoor unit number→last protection/error code→capacity demand(cycle)

Explanation for the some display content:

1. Running mode:

Display	Corresponding mode
0	Off
1	Cooling mode
2	Heating mode

2. Fan state:

Display	Corresponding mode
0	Off
1	Low fan
2	High fan

3. Opening degree of EXV:
Opening degree equals the display data times 8;
4. Number of indoor unit
The indoor unit that can communicate with outdoor unit normally.

9.12 Outdoor fan speed control

There is one fan with two-speed, the fan speed is controlled according ambient temp. After the compressor stop, 30 seconds later the fan stop.
When cooling:

Ambient temp.rise	> 27	High speed
	<27	Low speed
Ambient temp.decline	>25	High speed
	<25	Low speed

When heating:

Ambient temp.rise	> 14	Low speed
	<14	High speed
Ambient temp.decline	>12	Low speed
	<12	High speed

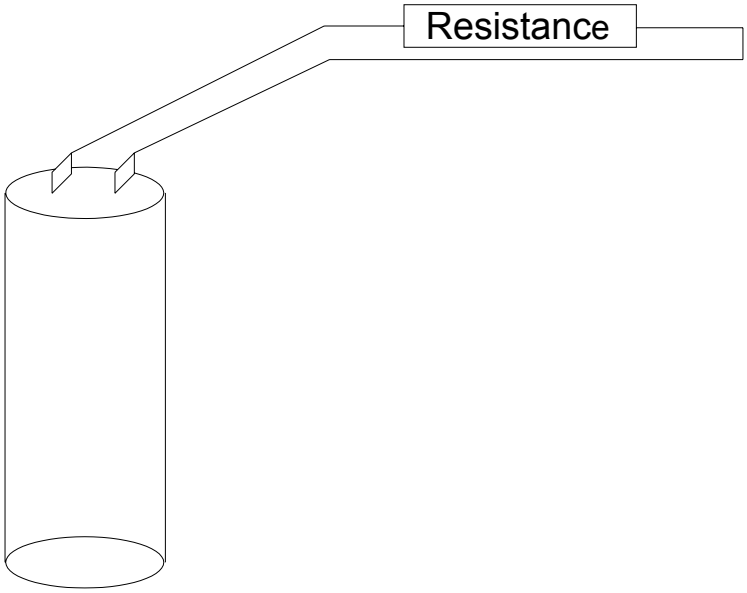
9.13 Oil return function

If operation frequency is lower than 54Hz in 2 hours consecutively, it will be increased to 62Hz for 3 minutes. Then it recovers to the former operation frequency.

10 Troubleshooting

10.1 Safety

Because of there are capacitors in PCB and relative circuit in outdoor unit, even shut down the power supply, electricity power still are kept in capacitors, do not forget to discharge the electricity power in capacitor.
The value of resistance is about 1500 ohm to 2000 ohm



The voltage in P3 and P4 in outdoor PCB is high voltage about 310V
The voltage in P5 and P6 in outdoor PCB is high voltage about 310V

10.2 LED error code display for indoor unit

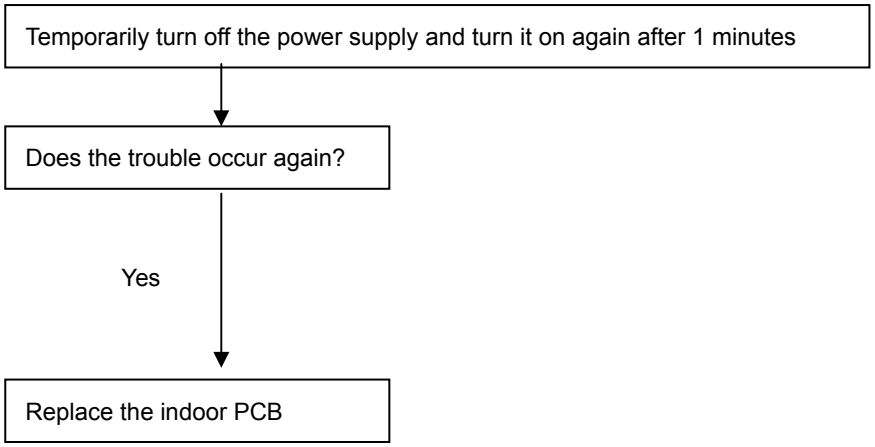
Display	LED STATUS
E0	EEPROM error
E1	Indoor and outdoor unit communication error
E2	Zero-crossing examination error
E3	Fan speed beyond control
E5	Outdoor units temp. sensor or connector of temp. sensor is defective
E6	Indoor units temp. sensor or connector of temp. sensor is defective
P0	Inverter module protection
P1	Outdoor unit voltage protection
P2	Compressor top protection against temperature
P3	Compressor current protection
P4	DC compressor drive position protection
P5	Outdoor low temp. protection

10.3 LED error code display for outdoor unit

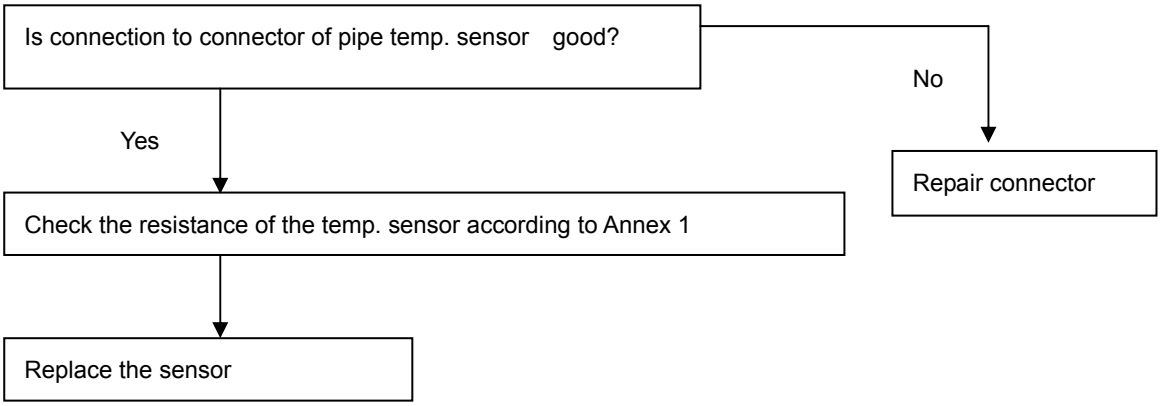
Display	Explanation
E0	EEPROM error
E1	No 1 Indoor units pipe temp. sensor or connector of pipe temp. sensor is defective
E2	No 2 Indoor units pipe temp. sensor or connector of pipe temp. sensor is defective
E3	No 3 Indoor units pipe temp. sensor or connector of pipe temp. sensor is defective
E4	Outdoor temp. sensor or connector of temp. sensor is defective
E5	Compressor voltage protection
E6	No 4 Indoor units pipe temp. sensor or connector of pipe temp. sensor is defective
E7	Indoor and outdoor communication error
P0	Compressor top protection against temperature
P1	High pressure protection (reserve)
P2	Low pressure protection (reserve)
P3	Compressor current protection
P4	Inverter module protection
P5	Outdoor low temp. protection
P6	Condenser high-temperature protection

10.3 Trouble shooting

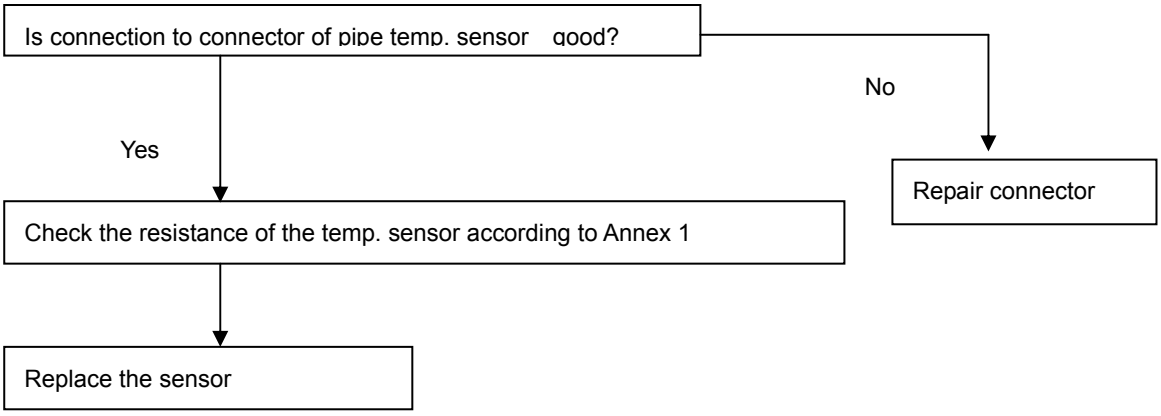
Display	LED STATUS
E0	EEPROM error


Temporarily turn off the power supply and turn it on again after 1 minutes
Does the trouble occur again?
Yes
Replace the indoor PCB

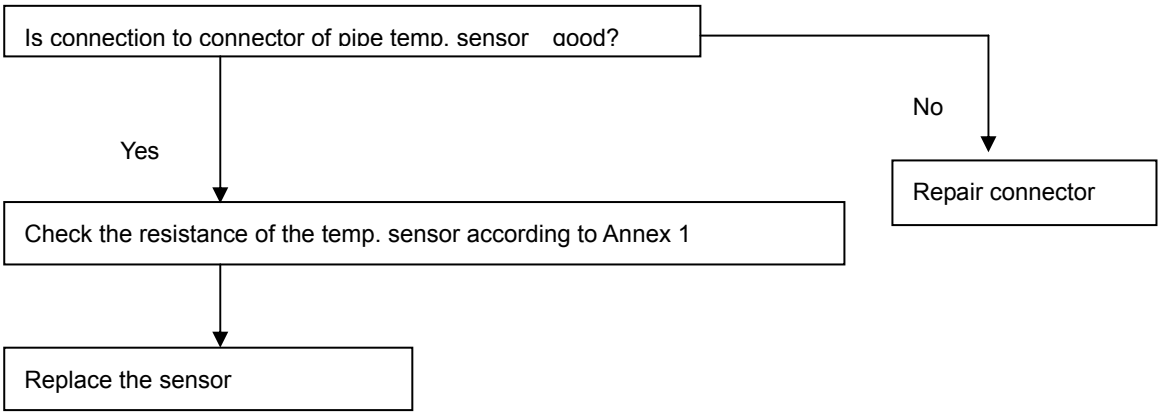
Display	LED STATUS
E1	No 1 Indoor units pipe temp. sensor or connector of pipe temp. sensor is defective


Is connection to connector of pipe temp. sensor good?
No
Repair connector
Yes
Check the resistance of the temp. sensor according to Annex 1
Replace the sensor

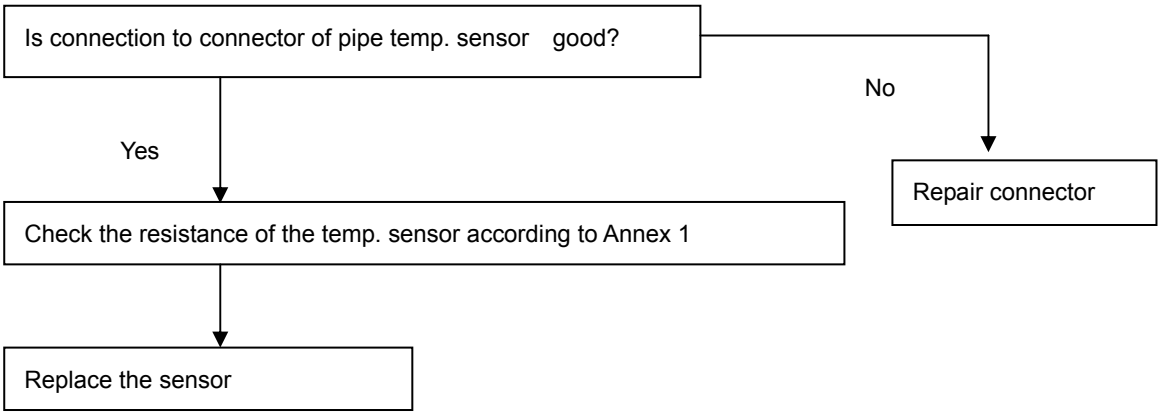
Display	LED STATUS
E2	No 2 Indoor units pipe temp. sensor or connector of pipe temp. sensor is defective


Is connection to connector of pipe temp. sensor good?
No
Repair connector
Yes
Check the resistance of the temp. sensor according to Annex 1
Replace the sensor

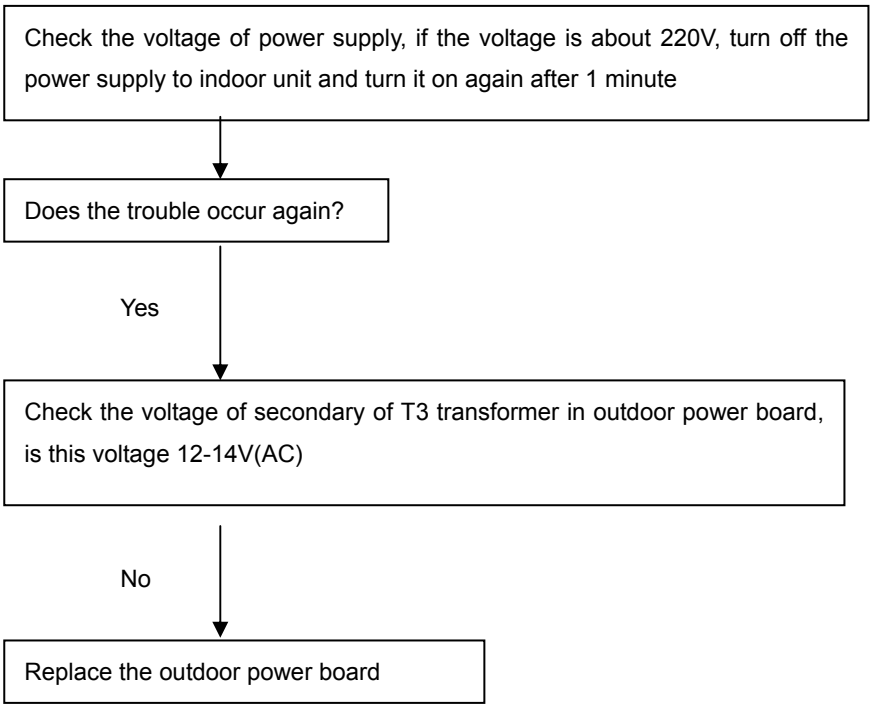
Display	LED STATUS
E3	No 3 Indoor units pipe temp. sensor or connector of pipe temp. sensor is defective


Is connection to connector of pipe temp. sensor good?
No
Repair connector
Yes
Check the resistance of the temp. sensor according to Annex 1
Replace the sensor

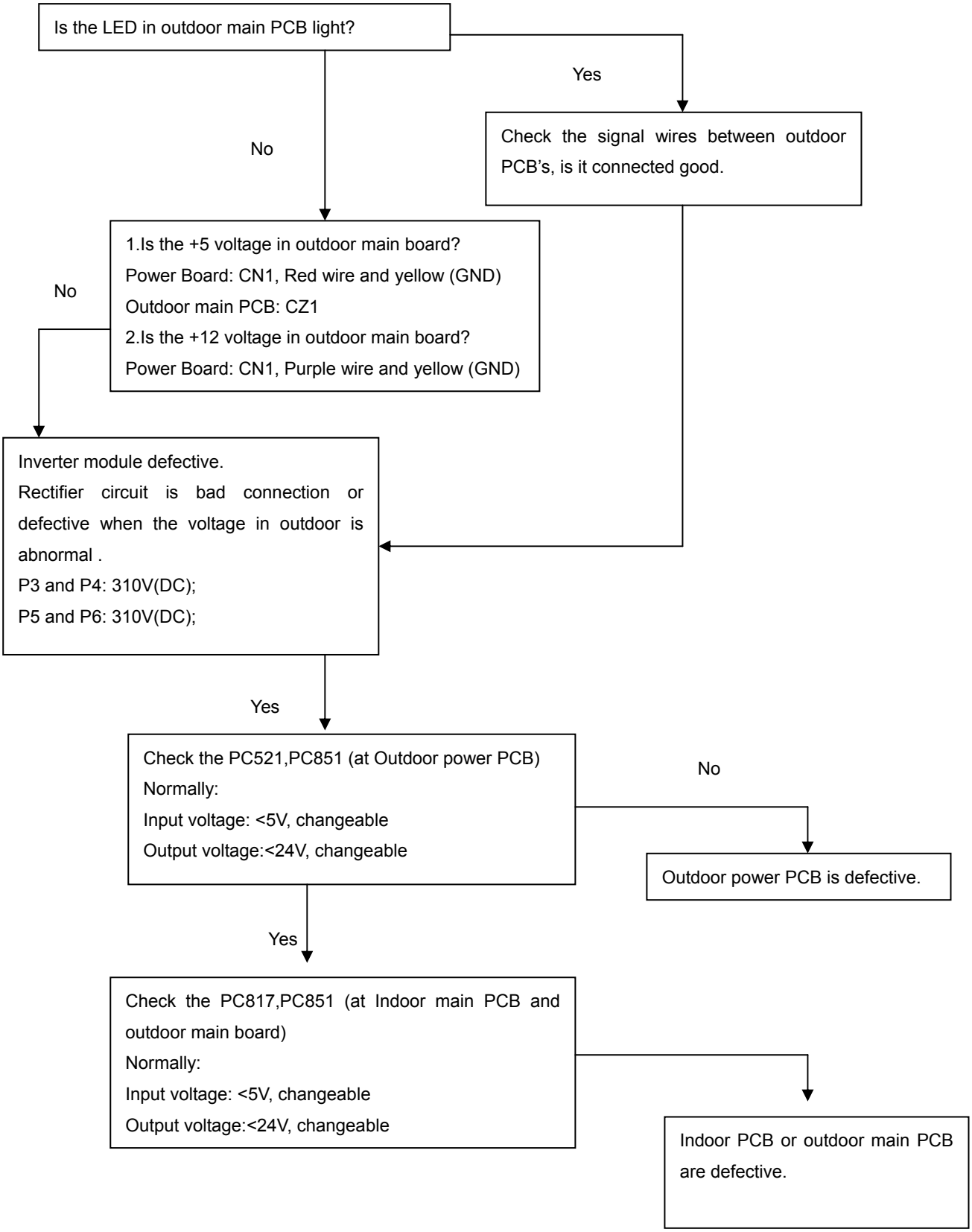
Display	LED STATUS
E4	Outdoor units temp. sensor or connector of temp. sensor is defective


Is connection to connector of pipe temp. sensor good?
No
Repair connector
Yes
Check the resistance of the temp. sensor according to Annex 1
Replace the sensor

Display	LED STATUS
E5	Compressor voltage protection

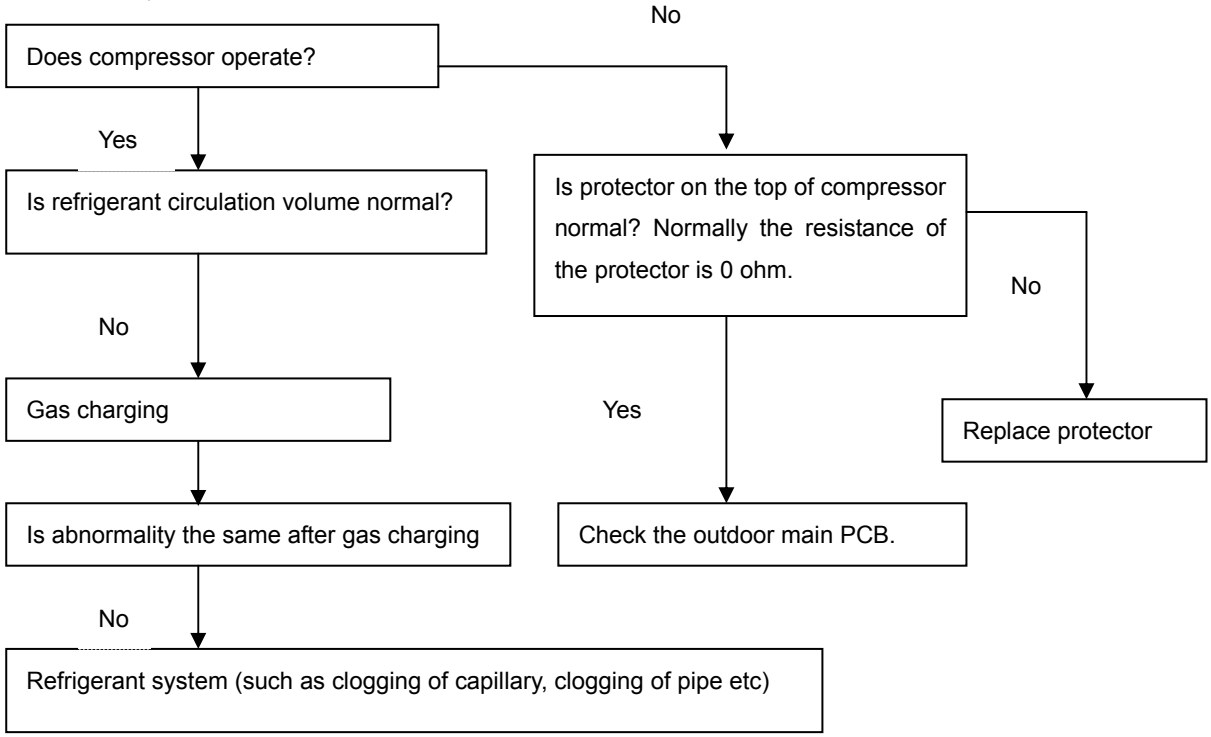

Check the voltage of power supply, if the voltage is about 220V, turn off the power supply to indoor unit and turn it on again after 1 minute
Does the trouble occur again?
Yes
Check the voltage of secondary of T3 transformer in outdoor power board, is this voltage 12-14V(AC)
No
Replace the outdoor power board

Display	LED STATUS
E7	Indoor / outdoor units communication protection

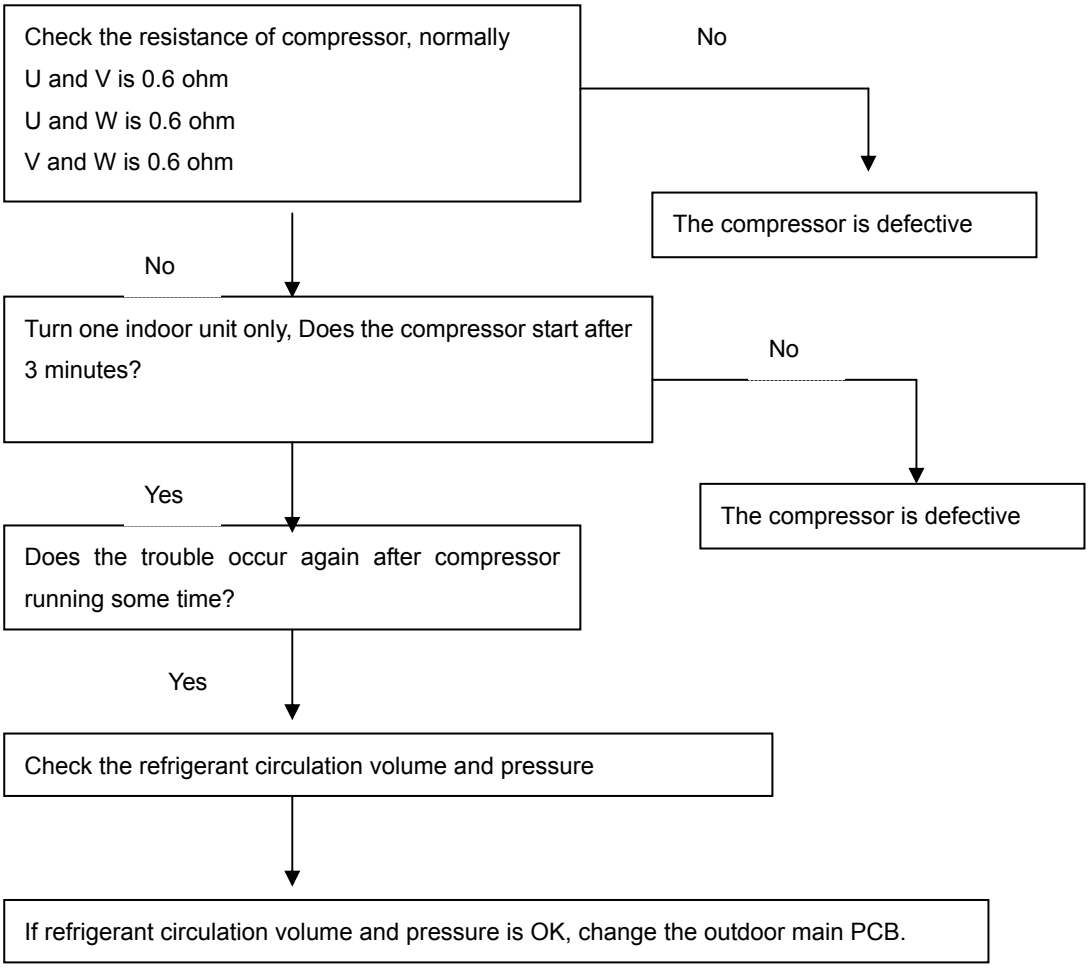

Is the LED in outdoor main PCB light?
Yes
No
Check the signal wires between outdoor PCB's, is it connected good.
1.Is the +5 voltage in outdoor main board?
Power Board: CN1, Red wire and yellow (GND)
Outdoor main PCB: CZ1
2.Is the +12 voltage in outdoor main board?
Power Board: CN1, Purple wire and yellow (GND)
No
Inverter module defective.
Rectifier circuit is bad connection or defective when the voltage in outdoor is abnormal .
P3 and P4: 310V(DC);
P5 and P6: 310V(DC);
Yes
Check the PC521,PC851 (at Outdoor power PCB)
Normally:
Input voltage: <5V, changeable
Output voltage:<24V, changeable
No
Outdoor power PCB is defective.
Yes
Check the PC817,PC851 (at Indoor main PCB and outdoor main board)
Normally:
Input voltage: <5V, changeable
Output voltage:<24V, changeable
Indoor PCB or outdoor main PCB are defective.

Display	LED STATUS
P0	Compressor top protection against temperature

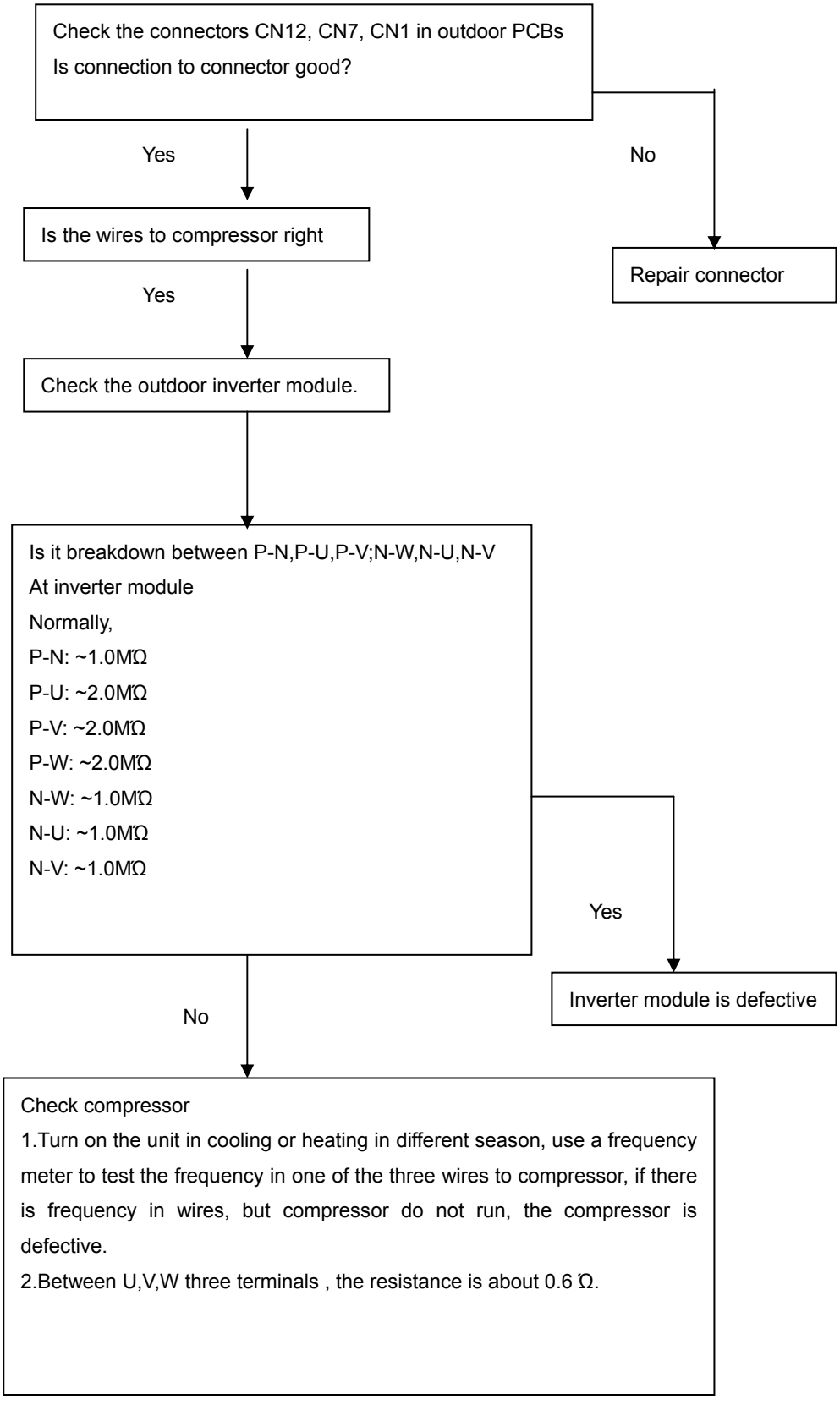
Off: 120°C; On: 105°C


Does compressor operate?
No
Yes
Is refrigerant circulation volume normal?
Is protector on the top of compressor normal? Normally the resistance of the protector is 0 ohm.
No
No
Gas charging
Yes
Replace protector
Is abnormality the same after gas charging
Check the outdoor main PCB.
No
Refrigerant system (such as clogging of capillary, clogging of pipe etc)

Display	LED STATUS
P3	Compressor current protection


Check the resistance of compressor, normally
U and V is 0.6 ohm
U and W is 0.6 ohm
V and W is 0.6 ohm
No
The compressor is defective
No
Turn one indoor unit only, Does the compressor start after 3 minutes?
No
The compressor is defective
Yes
Does the trouble occur again after compressor running some time?
Yes
Check the refrigerant circulation volume and pressure
If refrigerant circulation volume and pressure is OK, change the outdoor main PCB.

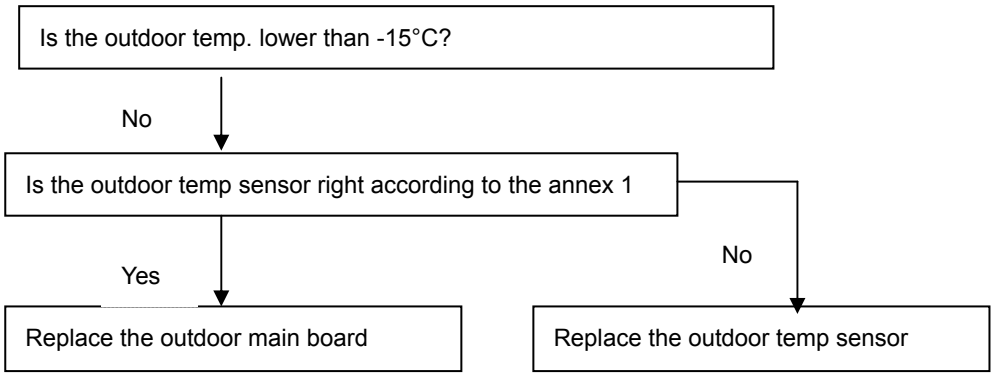
Display	LED STATUS
P4	Inverter module protection


Check the connectors CN12, CN7, CN1 in outdoor PCBs
Is connection to connector good?
Yes
No
Is the wires to compressor right
Repair connector
Yes
Check the outdoor inverter module.
Is it breakdown between P-N,P-U,P-V;N-W,N-U,N-V
At inverter module
Normally,
P-N: ~1.0MΩ
P-U: ~2.0MΩ
P-V: ~2.0MΩ
P-W: ~2.0MΩ
N-W: ~1.0MΩ
N-U: ~1.0MΩ
N-V: ~1.0MΩ
Yes
Inverter module is defective
No
Check compressor
1.Turn on the unit in cooling or heating in different season, use a frequency meter to test the frequency in one of the three wires to compressor, if there is frequency in wires, but compressor do not run, the compressor is defective.
2.Between U,V,W three terminals , the resistance is about 0.6 Ω.

Display	LED STATUS
P5	Outdoor low temp. protection

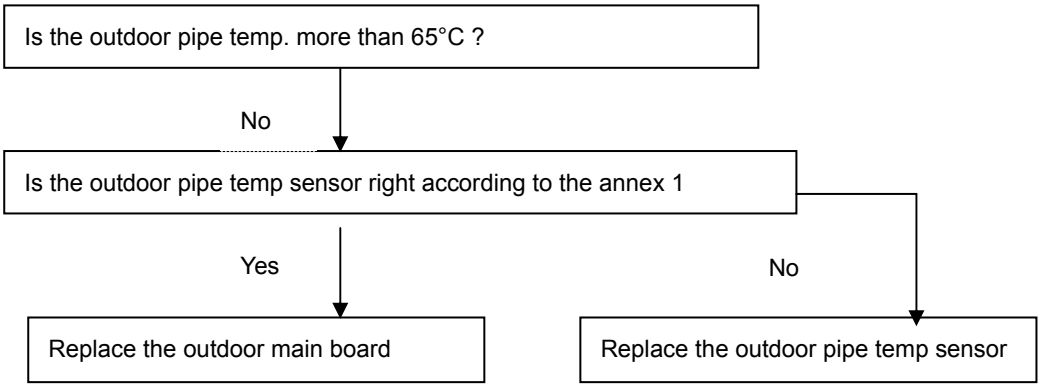
This is optional, factory standard unit does not have this function.

Unit stops when outdoor temp. is lower than -15°C and lasting time more than 60 minutes, and unit runs again when outdoor temp. more than -12°C.


Is the outdoor temp. lower than -15°C?
No
Is the outdoor temp sensor right according to the annex 1
Yes
No
Replace the outdoor main board
Replace the outdoor temp sensor

Display	LED STATUS
P6	Condenser high-temperature protection

When outdoor pipe temp. is more than 65°C, the unit will stop, and unit runs again when outdoor pipe temp. is less than 52°C.


Is the outdoor pipe temp. more than 65°C ?
No
Is the outdoor pipe temp sensor right according to the annex 1
Yes
No
Replace the outdoor main board
Replace the outdoor pipe temp sensor

Annex 1

Characteristic of temp. sensor

Temp.℃	Resistance KΩ		Temp.℃	Resistance KΩ		Temp.℃	Resistance KΩ
-10	62.2756		17	14.6181		44	4.3874
-9	58.7079		18	13.918		45	4.2126
-8	56.3694		19	13.2631		46	4.0459
-7	52.2438		20	12.6431		47	3.8867
-6	49.3161		21	12.0561		48	3.7348
-5	46.5725		22	11.5		49	3.5896
-4	44		23	10.9731		50	3.451
-3	41.5878		24	10.4736		51	3.3185
-2	39.8239		25	10		52	3.1918
-1	37.1988		26	9.5507		53	3.0707
0	35.2024		27	9.1245		54	2.959
1	33.3269		28	8.7198		55	2.8442
2	31.5635		29	8.3357		56	2.7382
3	29.9058		30	7.9708		57	2.6368
4	28.3459		31	7.6241		58	2.5397
5	26.8778		32	7.2946		59	2.4468
6	25.4954		33	6.9814		60	2.3577
7	24.1932		34	6.6835		61	2.2725
8	22.5662		35	6.4002		62	2.1907
9	21.8094		36	6.1306		63	2.1124
10	20.7184		37	5.8736		64	2.0373
11	19.6891		38	5.6296		65	1.9653
12	18.7177		39	5.3969		66	1.8963
13	17.8005		40	5.1752		67	1.830
14	16.9341		41	4.9639		68	1.7665
15	16.1156		42	4.7625		69	1.7055
16	15.3418		43	4.5705		70	1.6469

Annex 2

1. Reference voltage data:

a) Rectifier : Input :220-230V(AC), output :310V(DC)

Normally In power board:

P3 and P4: 310V(DC)

P5 and P6: 310V(DC)

b) Inverter module: U,V, W 3ph.

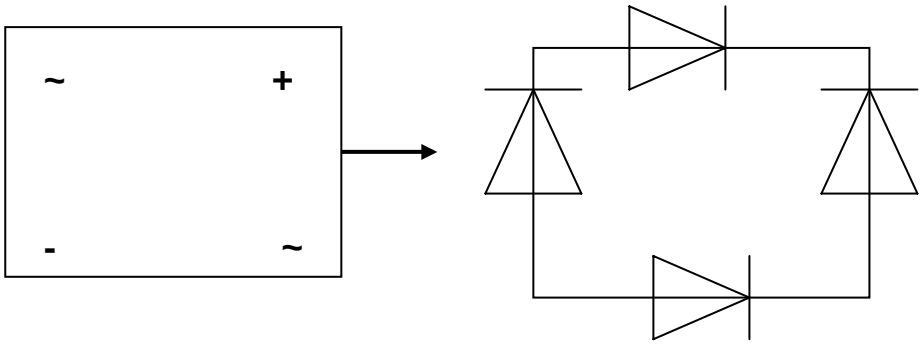
	Result
U-V	60-150V(AC)
U-W	60-150V(AC)
V-W	60-150V(AC)
P-N	DC 310V

c) Photo-couple PC817, PC851: Control side <+5V, AC side :< 24V(AC)

d) S terminal and N: changeable from 0-24V

2. Check the Diode Bridge component (In wiring diagram, rectifier)

Remark: If this part is abnormal, the LED will not light.



Multi-meter		Result	
		Forward Resistance	Backward Resistance
+	—	Infinite	Infinite
~	+	~500 ohm	Infinite
~			
-	~	~500 ohm	Infinite
	~		